

# Exhibit 5

## Harvard Medical School/Harvard School of Dental Medicine

### Format for the Curriculum Vitae

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**Place of Birth:** Nanticoke, Pennsylvania

#### Education

1965	BS	Biology	King's College, Wilkes- Barre, PA
1969	MD	Medicine	University of Pittsburgh, Pittsburgh, PA

#### Postdoctoral Training

1969-1970	Intern	Pathology	Massachusetts General Hospital
1970-1971	Assistant Resident	Pathology	Massachusetts General Hospital
1969-1972	Teaching Fellow	Pathology	Harvard Medical School
1971-1972	Research Fellow	Physiology	Harvard School of Public Health
1971-1973	Teaching Fellow	Pathology	University of North Carolina, Chapel Hill

#### Faculty Academic Appointments

1973-1978	Assistant Professor	Pathology	Medical College of Pennsylvania
1976-1978	Assistant Professor	Pathology, Graduate Faculty	Medical College of Pennsylvania
1978-1984	Assistant Professor	Pathology	Harvard Medical School
1978-1984	Assistant Professor	Environmental Health	Harvard School of Public Health
1984-2015	Associate Professor	Pathology	Harvard Medical School
1984-2015	Associate Professor	Environmental Health	Harvard School of Public Health

2015-2017	Professor	Pathology	Harvard Medical School
2015-2017	Professor	Environmental Health	Harvard TH Chan School of Public Health
2018-	Professor, Emeritus	Pathology	Harvard Medical School

### **Appointments at Hospitals/Affiliated Institutions**

1973-1978	Assistant Pathologist	Pathology	Hospital of the Medical College of Pennsylvania
1973-1978	Attending Pathologist	Autopsy & Surgical Pathology Service	Hospital of the Medical College of Pennsylvania
1978-1980	Associate Pathologist	Pathology	Brigham and Women's Hospital
1978-1997	Attending Pathologist	Autopsy Pathology Service	Brigham and Women's Hospital
1978-2017	Consulting Pathologist in Pulmonary Diseases	Surgical Pathology Service	Brigham and Women's Hospital
1978-2017	Consulting Pathologist in Pulmonary Diseases	Autopsy Pathology Service	Brigham and Women's Hospital
1979-1986	Associate Pathologist	Pathology	Parker Hill Medical Center
1980-2001	Pathologist	Pathology	Brigham and Women's Hospital
2001-2017	Senior Pathologist	Pathology	Brigham and Women's Hospital

### **Other Professional Positions**

1971-1973	Chief, Pathology Section, Pathobiology Branch, Environmental Biology Laboratory	Environmental Protection Agency
1973-1978	Director Inhalation Pathology Laboratory	Medical College of Pennsylvania
1976-1979	Consultant	Biosearch, Inc.
1980-1997	Consulting Pathologist	West Roxbury VA Hospital
1987-2005	Consulting Scientist	Forchung Centrum fur Umwelt und Gesundheit
1993-1996	Consultant	NIOSH Appalachian Laboratory
1998-2001	Consulting Scientist	RIVM
2001-2002	Consulting Pathologist, Inhalation Chemotherapy Program	Battelle Pulmonary Therapeutics, Inc.
2001-2005	Consultant	St. Lawrence Cement Company
2007	Invited Consultant	New York city Medical Examiner's Office regarding lung disease resulting from dust inhalation in connection with the terrorist attacks on 9/11/01
2007	Member of Delegation to China	Air and Waste Management Association

2010-	Consultant	University of Sao Paulo, Faculty of Medicine, Department of Pathology Environmental Research Program
2017-	Consultant	Harvard Nanoparticle Safety Center Harvard TH Chan School of Public Health
2017-	CEO/CFO	John Godleski, MD, P.L.L.C

### Major Administrative Leadership Positions

#### **Local**

1978	Director, Autopsy Pathology Service	Hospital of the Medical College of Pennsylvania
1978-2015	Director, Pulmonary Pathology Division	Brigham and Women's Hospital
1988-2017	Director, Electron Microscopy Laboratories	Harvard School of Public Health
1996-2002	Principal Investigator: Mechanisms of Morbidity and Mortality Associated with Air Particles	NIH Program Project
1998-2016	Associate Director	Harvard-EPA Center for Ambient Particle Health Effects
2002-2008	Laboratory Coordinator	Peabody Society, General Pathology Course, Harvard Medical School
2004-2017	Harvard Faculty Coordinator	Faculty of Medicine University of Sao Paulo-Harvard School of Public Health - Medical Student Research Program
2006-2017	Director	Harvard-NIEHS Center Ambient Particle Research Core

#### **National and International**

1987	Seminar Chairman, Particle Deposition in Lung Compartments	US-FRG conference on Cooperation in Pulmonary Research, Boston
1988	Mini-Symposium Chairman and Invited Lecturer, Macrophages as Mediators of Pulmonary Disease	FASEB Annual Meeting, Las Vegas, NV
1988	Session Chairman, Structural and Biochemical Correlations and the Relationships Between Acute and Chronic Lung Injury	US-FRG Cooperative Program in Pulmonary Research Workshop: Structural Consequences of Biochemical and Cellular Changes in the Lungs Caused by Injury, Günzburg, West Germany
1992	Organizer and Program Chairman, Plenary Lecture, Detection of Elements in Lung Cells and Tissue using ESI and EELS	First North American Zeiss CEM902 Users Meeting, Boston
1998	Organizing Committee, NIH Workshop on Inhaled Environmental Irritants and Allergens: Mechanisms of Cardiopulmonary and Systemic Responses	NIH workshop held in conjunction with American Thoracic Society Meeting, Chicago, IL
2002	Organizing Committee Chair, EPA Center Director's Meeting	EPA, Boston, MA

2006	Member, Organizing Committee, The Role of Air Pollutants in Cardiovascular Disease	Research Triangle Park, NC
2006	Organizing Committee Chair, EPA Center Director's Meeting	EPA, Boston, MA
2007	Organizing Committee Member, EPA Center Director's Meeting	EPA, Research Triangle Park, NC
2007	Invited Participant, NASA Lunar Dust Workshop	NASA, Goddard Space Center, CA
2013	Organizing Committee Member, EPA Center Director's Meeting	EPA, Seattle, WA

## Committee Service

### Local

1973-1978	Animal Usage and Facilities Committee	Medical College of Pennsylvania Member
1974-1978	Research Support Service Committee	Medical College of Pennsylvania Member
1975-1978	Resident Selection Committee, Department of Pathology	Medical College of Pennsylvania Chair
1979-1981	Current Practice Committee	Brigham and Women's Hospital Member
1980	Pathology House Staff Committee	Brigham and Women's Hospital Member
1981	Nominating Committee for Vice Chairperson of the Professional Staff	Brigham and Women's Hospital Member
1987, 1996	Autopsy Service Quality Assurance	Brigham and Women's Hospital Auditor
1987-1990	Committee on the Use of Human Subjects in Research	Harvard School of Public Health Member
1989-1998	Post-doctoral Fellow Selection Committee, Department of Pathology	Member
1993	Search Committee for Assistant Professor of Physiology	Harvard School of Public Health Member
1993-1995	Graduate Medical Education Committee	Member
1997-2017	Leadership Committee	Brigham and Women's Hospital Member
1997-2017	Thoracic Oncology Program Steering Committee	Brigham and Women's Hospital/Dana Farber Cancer Institute Member
2006-2017	NIEHS Center for Environmental Health Executive Committee	Harvard School of Public Health Member
2011-2016	Faculty Advisory Committee of the Brazil Studies Program at Harvard's David Rockefeller Center for Latin American Studies (DRCLAS)	Harvard University Member
2015-16	Search Committee for Assist Professor AB	Harvard TH Chan School of Public Health

**National and International**

1992	Organizing Committee	First North American Zeiss CEM902 Users Meeting, Boston, MA Organizer and Host
1997	Workshop on Particulate Air Pollution Research	Health Effects Institution, Boston, MA Member
1997	Particulate Matter Workshop Defining the Research Agenda on Particulate Pollution	EPA, Research Triangle Park, NC Member
1998	Peer Review Committee	Center for Indoor Air Research, Washington, DC Member
1999	Committee to Review the Fossil Energy Research Plan for Fine Particulates of the US Dept. of Energy	National Research Council/National Academy of Sciences, Washington, DC Member
1999-2001	Review Committee	EPA Air Quality Criteria Document on Particulate Air Pollution, Washington, DC Member
2000-2005	Advisory Committee	Southern California Center for Environmental Research, Los Angeles, CA Member
2001	Environmental Sciences Health Science Review Committee	NIEHS/NIH, Research Triangle Park, NC ad hoc Member
2002	Organizing Committee	EPA Center Director's Meeting, Rochester, NY Member
2002	Organizing Committee Member, EPA Workshop on Environmentally Induced Cardiovascular Disease	NIH, Research Triangle Park, NC Member
2002	External Advisory Committee	US EPA State of the Environment Report, Research Triangle Park, NC Member
2003	Review Committee	World Health Organization Document on Particulate Air Pollution Member
2006	Organizing Committee	The Role of Air Pollutants in Cardiovascular Disease, Research Triangle Park, NC Member
2006	Organizing Committee	EPA Center Director's Meeting Chair
2007	Organizing Committee	EPA Center Director's Meeting Member
2011-2012	Organizing Committee	Occupational Health and Safety Summit, Philadelphia, PA Member
2011-2013	National Particle Components Toxicity (NPACT) Report Review Panel	Health Effects Institute, International NPACT Report Review Panel, Boston, MA

2012	EPA Centers' Webinar Conference	Member EPA, Research Triangle Park, NC
2013-2014	Advanced Collaborative Emissions Study (ACES) Report Review Panel	Organizer and Chair Health Effects Institute, International ACES Report Review Panel, Boston, MA
2016-2017	Environmental Health Policy Committee of the American Thoracic Society	Member Member
2019-	Health Canada Talc Screening Assessment	Ad Hoc Expert

### Professional Societies

1975-2015	International Academy of Pathology 1990-1992	Member Reviewer Abstract Review Committee, Atlanta, GA
	1991	Session Chair, Pulmonary Pathology, Annual Meeting, Chicago, IL
1976-2014	American Association for the Advancement of Science	Member
1976-2010	American Association of University Professors	Member
1979-	New England Society of Pathologists	Member
1985-2015	Boston Pulmonary Pathology Roundtable	Founding Member
1986-	American Thoracic Society 2008	Member Member, Program Committee, Environmental and Occupational Health Assembly, Annual International Meeting, Toronto, Canada
1988-	American Society for Investigative Pathology	Member
1990-	Microscopy Society of America	Member
1999-2013	International Society for Aerosols in Medicine 2011	Member
2003-2008	American Association for Aerosol Research	Reviewer, Annual Mtg San Francisco, CA
2005-	Pulmonary Pathology Society	Member
2006-2014	Air and Waste Management Association	Member

### Grant Review Activities

1981	Toxicology Special Study Section	NIH Member
1985-1986	Program Project Special Study Section	NIH Member
1987	NIEHS Special Study Section on Acid	NIH

	Aerosols	Member
1987	NHLBI Special Study Section on Pulmonary Fibrosis	NIH
1988	Health Effects Institute Study Section	HEI
1988	Fogarty International Fellowships Special Study Section	NIH
1993	NIEHS Special Study Section on Oxidant Air Pollutants	NIH
1994	NIEHS Program Project Study Section	NIH
1997	NIEHS Special Study Section on Oxidant Mechanisms	NIH
2002	Investigative Programs at University of Leuven	University of Leuven, Belgium
2003	ZRG1 CDF-3 S10 Study Section	Reviewer
2003-2004	NIEHS Special Study Section on Mentored Training Program Grants	NIH
2003	Health Canada Research Grants	Canadian Government ad hoc Reviewer
2003	Southern California Particle Center Pilot Project Grants	ad hoc Reviewer
2004	NEIHS Special Study Section on Mentored Training Program Grants	NIH
2004	Study Section on Nanoparticle Research Grants	Member
2004	NIEHS Special Study Section on Superfund Research Application	EPA
2005	NIEHS Special Study Section on K-08 Training Grants and K-24 Grants	Member
2007	Study Section on Coarse Particle Research Grants	NIH
2007	NCI Special Study Section on Lung Cancer and Inflammation	Member
2013-14	Kentucky Science and Engineering Foundation (KSEF)	ad hoc Reviewer

### Editorial Activities

#### *Ad hoc reviewer*

Advances in Public Health

American Journal of Pathology

American Journal of Respiratory and Critical Care Medicine

American Review of Respiratory Disease Chest

Circulation

Circulation Research

Environmental Health

Environmental Health Perspectives

Environmental Pollution  
Environmental Research  
Inhalation Toxicology  
Journal of Air and Waste Management Association  
Journal of Global Health  
New England Journal of Medicine  
Toxicology Letters  
Toxicological Sciences

### **Other Editorial Roles**

1998-2004	Editorial Board Member	Inhalation Toxicology
2003-	Editorial Board Member	Journal of Pneumology
2011	Guest Editor - Toxicological Evaluation of Realistic Emission Source Aerosols (TERESA)	Inhalation Toxicology
2011-	Editorial Board Member	Journal of Environ & Analytic Toxicology
2012-	Editorial Board Member	ISRN Pulmonology
2012-2016	Editorial Board Member	Circulation
2013-	Editorial Board Member	Advances in Public Health

### **Honors and Prizes**

1965	Aquinas Society Honor	King's College
1967	First Award	SAMA-Mead Johnson Scientific
	Medical student research	Forum
1975	Pulmonary Young Investigator Award	NIH, NHLBI
1978	Golden Apple Award for Outstanding Teaching	Medical College of Pennsylvania
1981	Father of the Year	Town of Weston, MA
1982	Traveling Fellowship to Poland	Weston Recreation Program
1988	US-FRG Cooperative Program in Pulmonary Research	National Academy of Sciences
1989	Honorary Fellow	National Institutes of Health
2011	Alumni Profile	Polish Society of Pathologists
		King's College, King's Pride Magazine
2016	Cub Scout Hero Award	Troop 42 Boy Scouts of America
2019	Outstanding Professional Achievement	Quincy, MA
		King's College
		Wilkes-Barre, PA

## **Report of Funded and Unfunded Projects**

**Funding Information** Costs included are the amounts that were available in financial records.

**Past Funded**

1975-2021	Training in Interdisciplinary Pulmonary Sciences NIH T32 HL007118 Mentor-consultant Training Grant for pre- and post-doctoral trainees in Interdisciplinary Pulmonary Sciences Lung Macrophage Antigens: Markers of Age and Function
1981-1991	
1981-1991	NIH RO1; HL27244 Principal Investigator Total Direct Costs: ~ \$1,250,000 Goals- To identify distinctive phenotypic surface antigens on lung macrophages, and th characterize the molecular identity of these antigens
1983-1995	Inhaled Particle Retention in Normal and Disease Lungs NIH HL31021 Principal Investigator Total Direct Costs: ~\$1,900,000 Goals- To define the patterns of inhaled particle distribution in animal models of pulmonary fibrosis, emphysema, and chronic bronchitis. To identify morphologically the short-term and long-term clearance patterns of inhaled particles deposited on airways and within alveolar parenchyma
1985-2020	Vascular, Pulmonary and Renal Injury NIH T32 HL007627 Mentor-consultant This Ruth L. Kirschstein Institutional National Research Service Award (T32) is focused on the postdoctoral training of M.D., M.D.-Ph.D., and Ph.D. candidates to prepare them to pursue independent careers as successful Clinician-Scientists and/or Biomedical Research Scientists, whose primary interest is the cellular and molecular mechanisms of human disease.
1991-1994	Regulation of Gene Expression in the Differentiation of Lung Macrophages: Fellowship for Joseph Paulauskis, PhD Francis Families Foundation Mentor to Fellow/Principal Investigator Total Direct Costs: \$100,000 Goals- To provide salary and research support for Dr. Paulauskis' transition from post-doctoral research fellow to a faculty position.
1991-1996	SCOR Grant: Chronic Disease of the Airway. Project 5: The Role of IL-8 in the Initiation of Inflammation in Chronic Bronchitis NIH HL19170 Leader, Project 5 Goals- To assess the role of macrophages and epithelial cells in chemokine and cytokine responses and their contribution to inflammation in chronic bronchitis
1993-1995	Prognostic Factor Analysis in Stage I NSCLC NIH CA60572 Co-Investigator

	Goals- To assess the prognostic importance of multiple histological and molecular parameters in 200 cases of stage 1, non-small cell lung cancer.
1995-1998	Mechanisms of Morbidity and Mortality from Exposure to Ambient Air Health Effects Institute HEI 95-9 Principal Investigator; \$609,494 Total Costs Goals: To develop a large animal model in which to assess the pulmonary and cardiac effects of concentrated ambient air particles.
1995-2000	Superfund Toxic Substances: Exposure and Disease. Project 6: Pathogenesis of Toxicity of Vanadium NIH PO1-ES05947 Leader, Project 6 Goals: To assess the response of alveolar macrophages to vanadium and to define mechanisms of toxicity.
1996-1999	Pathophysiologic Mechanisms of Mortality Associated with Exposure to Concentrated Particle Urban Air Toxics EPA R-825-242 Principal Investigator Total Direct Costs- \$588,372 Goals- To assess pathophysiological mechanisms including pulmonary inflammation associated with exposure to ambient air particulate, and to determine components in the exposure responsible for the outcomes.
1997-1999	Canicular Mechanisms of Bile Formation NIH RO1 DK53512 Site Principal Investigator; \$29,338 Total Indirect Costs Goals- To provide analytical electron microscopy support to identify the location and translocations of fluorinated bile salts.
1997-2003	Mechanisms of Morbidity/Mortality Due to Air Particles NIH PO1 ES08129 Principal Investigator; \$6,400,065 Total Costs Goals- To identify pulmonary, cardiovascular, and systemic responses to inhaled concentrated ambient particles and to explore pathophysiological mechanisms to explain these responses.
1999-2001	Cardiac Response Mechanisms Associated with Exposure to Concentrated Ambient Air Particles Health Effects Institute Principal Investigator; \$378,626 Total Costs Goals- To assess heart rate, heart rate variability, T-wave alternans and effects of cardiac ischemia on inhaled concentrated ambient particles.
1999-2004	Ambient Particle Health Effects: Exposure, Susceptibility and Mechanisms EPA Co-Director of Center; \$5,055,515 Total Costs Goals- To develop a comprehensive approach to determining the acute effects of exposure to increased levels of ambient air particulate.
1999-2005	Ambient Particles and Cardiac Vulnerability in Humans NIH PO1-2509825 Co-Investigator Goals- To assess cardiovascular outcomes with exposure to ambient particulate in people.

- My role in this grant was to co-ordinate and inform investigators of new data from animal studies.
- 2001-2002 NCRR Share Instrument Grant: Scanning Electron Microscopy System  
NIH SIO RR14653-01  
Principal Investigator; \$315,770 Total Costs  
Goals- To purchase a scanning electron microscope for our program and for a multi-user group within the Harvard Medical area.
- 2002-2007 Oxidant Mechanisms in Response to Ambient Air Pollution  
NIH RO1 HL68073  
Co- Investigator  
Goals: To assess the pulmonary and cardiac effects of ambient particulate air pollution using *in vivo* chemiluminescence.
- 2002-2007 Harvard Lung Cancer Spore: Pathology/Tissue Bank Core  
NIH P50 CA090578  
Core Director; \$126,020 Total Costs Core Only  
Goals: To provide pathology support including histopathological interpretation, immunoperoxidase staining, and tissue bank storage of lung cancer cases for use in correlative studies.
- 2002-2010 Comparative Toxicity of Secondary Coal Combustion and Mobile Source Emissions  
Electric Power Research Institute EP-P10983/C5530  
Co-Principal Investigator; Annual direct cost \$1.2 million  
Goals: To develop and test an exposure system in which the emmisions of power plants are aged and reacted with natural pollutants and then used to expose experimental animals.
- 2002-2018 Graduate Training in Biostatistics  
NIH T32 ES07142  
Mentor-consultant  
To prepare pre-doctoral and postdoctoral fellows for research in the application of biostatistics to environmental health
- 2004-2010 Cardiac Vulnerability Due to Ambient Particulates  
NIH ES012972  
Principal Investigator; \$2,867,655 Total Costs  
Goals: To expand our understanding of the mechanisms of air particulate exposure on the cardiovascular system.
- 2005-2010 EPA Center: Ambient Particle Health Effects: Novel Exposure Scenarios to Define the Health Effects of Particle Sources  
EPA RD-83241601-3  
Associate Director; \$ 2,722,457 Total Indirect Costs
- 2010-2013 Statistical Methods for the Effects of Multiple Air Pollution Constituents  
HEI 5523805  
Co-Investigator
- 2008-2014 The Epidemiology of Molecular Alterations in Mesothelioma  
NIH RO1 CA126939
- 2011-2016 EPA Center: Harvard Clean Air Research Center  
EPA RD 83479801  
Associate Director and Head of Project 1  
Supports toxicological studies, epidemiological studies, field monitoring, and laboratory studies of components of ambient air particles and their effect on health. Project 1:

	Animal toxicology studies assessing primary and secondary traffic-related particles on the lung, heart and central nervous system.
2014-2019	Occupational and Environmental Health Center Grant NIH ES000002 Director and Investigator, Particle Research Core; \$3,475,539 direct Total Costs; \$127,000 Total direct Costs for the Core Through the organizational structure and financial support provided by the NIEHS Center Grant, investigators will increase the impact of their research and teaching in environmental health. In toto, the Harvard NIEHS Center for Environmental Health is a major focal point for environmental research and training in Boston. The NIEHS Center mechanism enhances connections and is part of a national and international network.
<b>Unfunded</b>	
2011-2016	Multi-Institutional SPORE in Malignant Pleural Mesothelioma NIH P50 CA Co-Director of the SPORE, Core Leader-Tissue and Pathology Core, Project Leader – Developmental Research Program Goals: In this Spore proposal, our goals are to standardize the way malignant pleural mesothelioma is treated by defining the elements that allow patient classification and personalized treatments, and by using the pooled resources to define and validate screening tests, new personalized targeted therapies and new insights into the pathobiology of this disease. By better defining the roles of key biological pathways and creating novel early-detection methods, our findings should pave the way to new therapeutic approaches in malignant pleural mesothelioma and lead to improved patient survival. Not Funded.
2011-2016	Chronic stress, aging, and air pollution susceptibility NIH 1 RO1 AG039590-01A1 Co-Principal Investigator Goals: Epidemiologic and toxicological evidence indicates that chronic stress – through alterations in immune response, inflammation, metabolic or autonomic function (collectively, ‘allostatic load’) -- may alter individual susceptibility to physical toxins, hastening the physiologic processes of aging. Profound spatial confounding between stressors and pollution in the community setting, however, limits the utility of epidemiologic methods alone to disentangle their effects or establish directionality in interactions, and cannot identify physiologic mechanisms. Our study employs a unique toxicological exposure paradigm to explore two key constructs of aging: (1) accumulated burdens of physical and psychosocial exposures over time, and (2) heightened susceptibility of an aged system – to examine two key aging-related outcomes: cardiovascular illness and cognitive decline. Not Funded.
2012-2017	Social Stress and Air Pollution NIH Site Principal Investigator Goals: Dr. Godleski and his laboratory at HSPH will be responsible for the performance of laboratory experiments using the Harvard Ambient Particle concentrator in the Inhalation Laboratory at HSPH. They will carry out the social stress model studies in laboratory rats and then expose them to either filtered air or concentrated ambient particles. Not Funded.
2013-2017	NCCLC-Center for Life Cycle Environmental Health and Safety Implications of Nano Enabled Products (NEPs) NSF-EPA

Project Two Leader

Goals: This project proposes to establish a multidisciplinary Center to assess and address environmental health and safety implications of nano-enabled products (NEP) throughout their life cycle. The Center includes 3 highly inter-disciplinary and integrated research projects that collectively address key scientific questions across the NEP manufacturing-nanorelease/exposure-disease continuum. Not Funded

2014-2018	A Novel Toxicological Approach to Urban Health Disparities <a href="#"><u>1R01HL122279-01</u></a> (MPI) Principal Investigator, MPI with Dr. Jane Clougherty Goals: This project proposes to apply a novel toxicological exposure paradigm, wherein we expose rats to chronic social stress (Social Dominance Paradigm) and traffic-related urban air pollution (TRUAP) -- to explore their separate and synergistic effects on continuous respiratory and cardiovascular function (using telemetry), to test the hypothesis that these stresses function through complementary but separate mechanisms, and by using varying levels of TRUAP exposure and chronic stress to reduce and eliminate health disparities. – Not funded.
2015-2020	Urban Air Pollution, Social Stress and Health Disparities <a href="#"><u>1P50ES026095-01</u></a> Principal Investigator. Goals: Program project intended to study Stress and Air Pollution using both epidemiologic and toxicological approaches to define health disparities. Not funded.
2015-2020	Cardio-pulmonary effects of fine particles and stress <a href="#"><u>1R01ES025771-01</u></a> (MPI) Principal Investigator; MPI with Dr. Jane Clougherty. Goals: Studies to assess traffic related air pollution and social stress in development of cardio-pulmonary disease using animal models . – Not Funded.
2017-2022	Toxicological screening of nanoparticle toxicity. 1R01ES026633-02 NIH PI- Dr.Philip Demokritou. Co-investigator; Goals: To develop a toxicological paradigm for in vitro and in vivo testing of selected nanoparticles at various stages of their life cycle. Not Funded
2017-2021	Air pollution and chronic degenerative disease: mechanisms and strategies to advance health of aging population. 1R01-AG052713-02 NIH PI - Dr. Federika DelMonte. Co-investigator. Goals: To determine the role of air pollution in mouse models of cardiac failure and degenerative neurological disease. Not Funded.
2017	Coherent Anti-Stokes Raman Scattering imaging NIH S10 application PI –Dr. Arthur McClellan. Co-investigator. Goals: To purchase an instrument that could be used to identify the chemical composition of foreign particles in tissues by Raman Spectroscopy and with polarized light microscopy, using routinely prepared, H&E stained, tissue slides. Not Funded

## **Report of Local Teaching and Training**

### **Teaching of Students in Courses**

1973-1978	Pulmonary Pathology 75 medical students	Medical College of Pennsylvania 1-hr lecture/wk for 8 wks
1973-1978	Pathology Course Laboratories 18 medical students	Medical College of Pennsylvania 6 hrs/wk for 3 mos
1974-1978	Endocrine Pathology, Carcinogenesis, Neonatal Pathology	Medical College of Pennsylvania

	75 medical students	1-hr lecture/wk for 8 wks
1979-2001	Pathophysiology of Infectious Diseases Laboratories	Harvard Medical School
	20 medical students	8 hrs contact
1980-	Respiratory Pathophysiology	Harvard Medical School
	medical students	Available for tutorial
1983-1986	Human Pathology	HMS-HST
	100 medical students	1-hr lecture
1984	Infectious Diseases (Pathology of Granulomata)	Harvard Medical School
	100 medical students	1-hr lecture
2002-2007	General Pathology Laboratory	Harvard Medical School
	medical students	8 2-hr sessions
2007-2015	Immunology, Microbiology and Pathology Laboratory	Harvard Medical School
	Harvard medical students	8 2-hr sessions
2007-2017	Research in Physiology -- HSPH students in Environmental Health Department	Harvard School of Public Health
2014	Urban adaptation to Climate Change- School of Engineering and Applied Sciences	16 2-hr sessions
	50 students	
2015-2016	Foundations in Pathology – Discussion Leader in 6 sessions, secondary teacher 4 Sessions.	1-hr lecture; Harvard Medical School 10 2-hr sessions

#### Formal Teaching of Residents, Clinical Fellows and Research Fellows (post-docs)

1988-2017	Pulmonary Pathology Pathology residents	Dept. of Pathology, BWH 1hr lecture
1996-2005	Thoracic Oncology Program Clinical Conference	BWH
	10 oncology fellows	1-hr conference/mo
1998-2016	Thoracic Surgery Conference	BWH
	Thoracic surgeons	1-hr conference/wk
2000-2016	Pulmonary Pathology, Surgical Pathology Conference	BWH
	Pathologists	1-hr conference/wk
2001-2016	Pulmonary Medicine, Radiology and Pathology Conference	BWH
	Pulmonologists	26 1-hr conferences/wk

#### Clinical Supervisory and Training Responsibilities

1973-1978	Attending Pathologist Surgical and Autopsy Pathology service coverage responsible for diagnoses and Resident training. Medical College of Pennsylvania	25 weeks per year
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1975-1978	Responsible for Recruitment of Pathology Residents and coordination of the Pathology Residency Program, Medical College of Pennsylvania	10 hrs/wk
1978-2015	Responsible for Pulmonary Pathology Program supervision and training of pulmonary pathology fellows and residents rotating through the service BWH	2 hrs/wk oversight and administration
1978-1985	Attending Pathologist, Pulmonary Pathology Service, BWH	2 hrs/day for 50 wks/yr
1978-1997	Attending Pathologist Autopsy Service, BWH	10 wks/yr
1985-1999	Attending Pathologist, Pulmonary Pathology Service, BWH	2 hrs/day for 26 wks/yr
1999-2017	Attending Pathologist, Pulmonary Pathology Service, BWH	3 hrs/day for 20 wks/yr
2014-2017	Attending Pathologist Autopsy Service, BWH	4 wks/yr

#### **Laboratory and Other Research Supervisory and Training Responsibilities**

1974-1978	Organizer and Participating Pathologist in Staff CPC's in Pathology Course, Medical College of Pennsylvania	4 per year
1976-1978	Organized and Administered Final Laboratory Examination in Pathology Course Medical College of Pennsylvania	1 per year
1976-1978	Organized and delivered introductory lectures in Pathology for House Staff, Medical College of Pennsylvania Hospital	6 per year
1983	Pathology Coordinator and Lecturer, Pathophysiology of Infectious Disease Course, Harvard Medical School	
2002-2008	Laboratory Coordinator, Peabody Society, General Pathology Course, Harvard Medical School	

#### **Formally Supervised Trainees (HMS Research Fellows indicated by \*)**

- \*1978-1980 Jeffrey Goldstein, MD Pathologist, Baptist Medical Center, Jacksonville Florida Primary mentor in pulmonary pathology. Fellowship in pulmonary pathology resulted in two clinical papers, one research paper as a fellow. As an academic pathologist, he has a substantial list of publications.
- \*1979-1982 Franci Tryka, MD Retired Associate Professor, Univ of Arkansas. Practice of pathology, Jackson Hole, Wyoming. Dr. Tryka is now retired. Primary mentor in pulmonary pathology and research. Fellowship in pulmonary pathology

	resulted in two clinical publications, and seven research publications as a fellow. As an academic pathologist, she has a substantial list of publications.
1982-1986	Angeline Warner, DVM, SD/Dean of Students, Tufts School of Veterinary Medicine Member of doctoral committee. Dr. Warner has been a clinical veterinarian at HMS and has become an outstanding academic administrator at Tufts Veterinary School.
*1983-1986	Lester Kobzik, MD/HMS-BWH Professor of Pathology and Former Director, Molecular and Integrative Physiological Sciences, Harvard School of Public Health Primary mentor in pulmonary pathology and research. Fellowship in pulmonary pathology resulted in seven high quality research papers while a fellow and early junior faculty member. Dr. Kobzik has become a leading physician scientist in pulmonary pathology, commensurate with his positions. Dr. Kobzik is now retired.
1985-1988	Colette Bizal, SD/Director, Sky Hill Institute Member of doctoral committee.
1985-1988	Donald K Milton, MD, SD/Professor and Chair, Environmental and Occupational Health Dept, University of Maryland School of Public Health Member of doctoral committee.
1987-1990	Joseph Paulauskis, PhD Professor of Pathology, Director of Biorepository University of Michigan, Former CEO Paradigm Biologics, Ann Arbor, MI. Former Vice President, Research and BioBanking at International Genomics Consortium, Adjunct Associate Professor, University of Michigan Primary mentor as post-doctoral fellow in respiratory biology. Gained a Parker B. Francis fellowship, had three primary publications as a fellow and seven more as an early junior faculty member with my influence. From 2001-2009 was Senior Director/Global Head of Pharmacogenomics at Pfizer R&D.
1988-1990	Tasneem Lalani, MS, MD/Private practice Mentor for master degree and master thesis
1989-1992	Robyn Rufner, PhD/ Former Director of Electron Microscopy/George Washington Univ Primary mentor as postdoctoral fellow. Multiple technical publications.
1990-1991	Andrew Smith, SD Member of doctoral committee; tutorial student.
1993-1996	Lisa Marchessault Pierce, DS/Director, Surgical Molecular Biology, Seattle Member of doctoral committee; co-mentor in laboratory research with Dr. Joseph Paulauskis; Published 3 papers as a graduate student.
1993-1996	Gregory Grabowski, PhD/ Professor and Chair, Department of Biology, Univ of Detroit, Mercy. Primary mentor as postdoctoral fellow; One publication.
1994-1997	Michael Shi, PhD/Senior Director, Novartis Primary mentor as postdoctoral fellow. Received individual NRSA grant. Published 5 high quality publications as a postdoctoral fellow including his publication in the Journal of Biological Chemistry showing that reactive oxygen species alone may induce chemokines.
1994-1997	Stella Tsai, MD, SD/University of Taiwan Member of doctoral committee.
1995-1998	Costas Sioutas, SD/ Professor of Environmental Engineering, Univ of Southern California. Member of doctoral committee. Primary mentor in developing the Harvard Ambient Particle Concentrator for use in animal exposures. Five high quality publications as a student.
1996-1997	Rebecca Stearns, MA/Technical Director, Electron Microscopy Lab, Harvard School of

	Public Health. Primary mentor for master's degree and laboratory research. One highly quoted publication as a graduate student. Multiple publications as technical director of electron microscopy laboratory.
1996-1998	Eric Lovett, PhD/Bioengineering, CPI Guidant Co-mentor as a post-doctoral fellow with Dr. Richard Verrier.
*1997-2000	Robert W. Clarke, PhD/ CEO, Pulmatrix Primary mentor as post-doctoral fellow. Five high quality, highly cited publications while a post-doctoral fellow. Credited in multiple reviews of air pollution toxicology literature with the first toxicological publication using inhalation of concentrated ambient particles.
*1998	Sara Vargas, MD/Associate Professor of Pathology, Children's Hospital and Harvard Medical School, Boston Primary mentor in pulmonary pathology. Fellowship in pulmonary pathology resulted in multiple co-authored clinical papers.
1998-2001	Brent Coull, PhD/Professor of Biostatistics, Harvard School of Public Health Co-mentor as post-doctoral fellow with Dr. Paul Catalano. One statistical methods paper as a post-doctoral fellow, and multiple co-authored publications with significant statistical contributions.
1999-2002	Joao Batalha, MD, PhD/Associate Professor, Univ of Sao Paulo Primary mentor for post-doctoral fellowship. Authored one of the most cited papers in particulate air pollution research showing vasoconstriction of the pulmonary vasculature.
1999-2002	Nan-Fei Jiang, PhD/Senior Scientist, BioTrove Co-mentor as post-doctoral fellow with Dr. Joseph Paulauskis.
*2000-2001	James R. Stone, MD, PhD/Assistant Professor of Pathology, Massachusetts General Hospital, Harvard Medical School, Boston Primary mentor in pulmonary pathology. Fellowship in pulmonary and cardiac pathology resulted in several clinical papers.
2000-2003	Sara Savage, DVM/Associate Director of Animal Services, Genzyme, Inc. Primary mentor in for post-doctoral fellowship. One excellent first author paper, and co-authored several others.
2001-2004	Gregory Wellenius, ScD/Associate Professor, Brown University School of Medicine Primary mentor for his doctorate degree. His thesis included 5 high quality publications one of which a peer reviewer predicted would be a paper likely to be most highly cited in air pollution research. Won Edgar Haber award for best HSPH thesis in laboratory research.
2002-2005	Miriam Lemos, PhD/ Research Scientist, Dept. of Pathology, Univ of Sao Paulo, Brazil Co-mentor as post-doctoral fellow with Dr. Beatriz Gonzalez-Flecha.
2002-2005	Edgar Diaz, MD/ Administrative coordinator NSF Center on Climate, University of San Diego; Former Research Scientist in Molecular and Integrative Physiological Sciences, Harvard School of Public Health. Primary mentor as post-doctoral fellow. Co-authored multiple publications.
*2003-2004	Robert Padera, MD, PhD/Associate Professor of Pathology, Brigham and Women's Hospital and Harvard Medical School Primary mentor in pulmonary pathology. Fellowship in pulmonary and cardiac pathology resulted in several clinical papers.
2003-2006	Pablo Ruiz, ScD/Scientist, Chilean Air Pollution Program Member of Member of doctoral committee; co-mentor in laboratory research with Dr. Petros Koutrakis in development of chamber and system for aged ambient aerosols.
2003-2006	Margaret Nikolov, ScD/Assistant Professor, Harvard School of Public Health

Member of Member of doctoral committee; co-mentor in laboratory research with Dr. Brent Coull in development of statistical methods for laboratory toxicologic data.

2006 Wesley Bonafe, MD/Physician in Ophthalmology, University of Sao Paulo, Brazil Primary mentor in one year visiting medical student program at HSPH.

2006 Guilherme Calomeni, MD/Academic Physician in Medicine, University of Sao Paulo, Brazil Primary mentor in one year visiting medical student program at HSPH.

2006 Guilherme Funaro, MD /Instructor in Psychiatry, University of Sao Paulo, Brazil Primary mentor in one year visiting medical student program at HSPH.

\*2006 Jey Chen, MD, PhD/Primary mentor in pulmonary pathology.

2006-2007 Carlo Bartoli, MD, PhD University of Louisville; Resident in Cardiac Surgery Hospital of the University of Pennsylvania, Philadelphia, PA. Primary mentor in Master degree studies at Harvard Extension school. Published six papers based on his work, two of which are of high quality and frequently cited.

2006-2008 Brock Christensen, ScD/Assistant Professor, Dept of Community Medicine, Dartmouth Medical School  
Member of doctoral research committee and primary mentor in assessment of asbestos exposure for tissue analyses.

\*2007 David Wu, MD Primary mentor in pulmonary pathology.

2007 David Pares, MD MBA Program, Harvard Business School, Lemann Fellow, Former Entrepreneur/CEO Brazilian Company for Digital Medical Records Primary mentor with Dr. Richard Verrier in one year visiting medical student program at HSPH.

2007 Daniel Oliva MD /Instructor in Psychiatry, University of Sao Paulo, Brazil Primary mentor in one year visiting medical student program at HSPH.

2007 Filipe Mota/ Instructor in Psychiatry, University of Sao Paulo, Brazil Primary mentor in one year visiting medical student program at HSPH.

2007 Marcos Croce/Instructor in Medicine, University of Sao Paulo, Brazil Primary mentor with Dr. Richard Verrier in one year visiting medical student program at HSPH.

2007 Nikolas Heine/Instructor in Psychiatry, University of Sao Paulo, Brazil Primary mentor in one year visiting medical student program at HSPH.

2007-2012 Denise Lamoreaux/Post-doctoral Fellow, HMS Bioinformatics Program. Primary Mentor for Doctoral Studies at HSPH.

2008 Mariana Acar – Physician in Medicine, University of Sao Paulo, Brazil Primary mentor in one year visiting medical student program at HSPH.

2008 Marcello Carvas—Physician in Plastic Surgery, University of Sao Paulo, Brazil Primary mentor with Dr. Richard Verrier in one year visiting medical student program at HSPH.

2008 Bruno Nacimiento Physician in Plastic Surgery, University of Sao Paulo, Brazil Primary mentor with Dr. Richard Verrier in one year visiting medical student program at HSPH.

\*2008-2009 Lynette Scholl, MD/Associate Professor of Pathology, Brigham and Women's Hospital, Harvard Medical School Primary mentor in pulmonary pathology.

2009 Gabriel Andrade Vaz/ Physician, University of Sao Paulo, Brazil Primary mentor with Dr. Richard Verrier in one year visiting medical student program at HSPH.

2009 Yasser Calil/ Practicing Physician, Amazonia, Brazil Primary mentor in one year visiting medical student program at HSPH.

2009 Ibere Datti/Physician in Medicine, University of Sao Paulo, Brazil Primary mentor with Dr. Richard Verrier in one year visiting medical student program at HSPH.

2009 Brenno Gomes/Physician in Medicine, University of Sao Paulo, Brazil

	Primary mentor in one year visiting medical student program at HSPH.
2009	Vivian Hatakeyama/Physician in Ophthalmology, University of Sao Paulo, Brazil
	Primary mentor in one year visiting medical student program at HSPH.
2009	Danilo Nanbu/ Physician in Pediatrics, University of Sao Paulo, Brazil Primary mentor with Dr. Richard Verrier in one year visiting medical student program at HSPH.
2009	Natascha Sandy—Physician in Pediatrics, University of Sao Paulo, Brazil Primary mentor with Dr. Richard Verrier in one year visiting medical student program at HSPH.
*2009-2010	Gina Cunto-Amesty, MD/Pathologist, Quest Diagnostics Primary mentor in pulmonary pathology.
2009-2011	Vasileios Papapostolou, ScD/Scientist California Air Resources Board. Post-doctoral fellow EER, Dept of Environmental Health HSPH. Member of doctoral committee; co-mentor in laboratory research with Dr. Petros Koutrakis in development of chamber and system for traffic-derived ambient aerosols.
2010	Helena Buonfiglio Resident in Medicine, University of Sao Paulo, Brazil Primary mentor in one year visiting medical student program at HSPH.
2010	Felipe Franco/Resident in Medicine, University of Sao Paulo, Brazil Primary mentor in one year visiting medical student program at HSPH.
2010	Vincente Mazzaro/Resident in Orthopedics, University of Sao Paulo, Brazil Primary mentor in one year visiting medical student program at HSPH.
2010	Paulo Yoo/Resident in Medicine, University of Sao Paulo, Brazil Primary mentor in one year visiting medical student program at HSPH.
*2010-2011	Wanghai Zhang, MD, Surgical and Pulmonary Pathologist, Univ of Massachusetts Medical Center Hospitals group Primary mentor in pulmonary pathology.
2010-2011	Justin Mih, PhD Entrepreneur. Member of Doctoral Thesis Committee, MIPS.
2011	Joao Paulo de Oliveira/Resident in Surgery, University of Sao Paulo, Brazil Primary mentor in one year visiting medical student program at HSPH.
2011	Rodrigo Sato/Resident in Medicine, University of Sao Paulo, Brazil Primary mentor in one year visiting medical student program at HSPH.
*2011-2012	Anthony Perry, MD, Anatomic Pathologist, St. Joseph's Hospital and Medical Center Phoenix, AZ. Primary mentor in pulmonary pathology.
*2011-2012	Michael Seidman, MD PhD, Assistant Professor of Pathology, University of British Columbia Primary mentor in pulmonary pathology.
*2011-2012	Paul VanderLaan MD, Assistant Professor of Pathology, Beth Israel-Deaconess Hospital Harvard Medical School. Primary mentor in pulmonary pathology.
2012	Lianna Tortato/ Resident in Surgery, University of Sao Paulo, Brazil, Primary mentor in one year visiting medical student program at HSPH.
2012	Hilario Francelino/ Resident in Medicine, University of Sao Paulo, Brazil, Primary mentor in one year visiting medical student program at HSPH.
2012-2015	Viviani Barnabe, PhD Assistant Professor and Director of Research University of Sao Paulo City. Post Doctoral Fellow, Department of Environmental Health, Harvard School of Public Health, Primary Mentor.
*2012-2013	Sara Pokerel, MD, PhD, Thoracic Pathologist, Rosewell Park Cancer Institute, Buffalo, NY Primary mentor in pulmonary pathology.
2013-2016	Alex Carll, PhD Assistant Professor University of Louisville, Dept of Pharmacology Post Doctoral Fellow, Department of Environmental Health, Harvard School of Public Health, Primary Mentor.

2013	Kuay Victor, Medical Student, University of Sao Paulo, Brazil, Primary mentor in one year visiting medical student program at HSPH.
2013	Thomás Jaeger, Medical Student, University of Sao Paulo, Brazil, Primary mentor in one year visiting medical student program at HSPH.
*2013-14	Marina Vivero, MD Assistant Professor of Pathology, Harvard Medical School, Thoracic Pathologist, Brigham and Women's Hospital Primary mentor in pulmonary pathology.
2013-14	Sebastian Gerbaudo, Graduate Student Johns Hopkins University, Framingham State University, Thesis Advisor.
2014	Douglas Zati/ Resident in Medicine, University of Sao Paulo, Brazil, Primary mentor in one year visiting medical student program at HSPH.
2014	Beatriz Lima/ Medical Student, University of Sao Paulo, Brazil, Primary mentor in one year visiting medical student program at HSPH.
2014	Samir Crespo/ Resident in Cardiology, University of Sao Paulo, Brazil, Primary mentor in one year visiting medical student program at HSPH.
2014-15	Talita Dias de Silva/ Member of the Faculty, University of Sao Paulo, Brazil, Primary mentor in one year visiting PhD student program at HSPH
*2014-15	Emil Racila, MD Assistant Professor of Pathology; Thoracic Pathologist University of Minnesota Medical School, Primary mentor in pulmonary pathology.
2015	Ana Laura Ricci/ Visiting PhD student University of Sao Paulo, Brazil, Primary mentor in one year visiting PhD student program at HSPH
2015	Mauricio Silva/ Residenrt in Medicine University of Sao Paulo. Visiting Medical Student, University of Sao Paulo, Brazil, Primary mentor in one year visiting medical student program at HSPH
*2015-2016	Prodipto Pal, MD Thoracic Pathologist University of Toronto, Former Fellow, Brigham and Women's Hospital, Mentor in pulmonary pathology.
2016	Guilherme S. Perez/ Medical Student, University of Sao Paulo, Brazil, Primary mentor in one year visiting medical student program at HSPH.

#### Formal Teaching of Peers (e.g., CME and other continuing education courses)

1979-1985	Chest Disease	
	Panel participant, Harvard Medical School	Boston, MA
1980	Chest Disease	1
	Participant, lecturer, session chairman, Harvard Medical School	Boston, MA
1982-1985	Pathology of Asthma	1
	Combined Clinical Immunology Conferences	Boston, MA
1983-1997	Pulmonary vascular disease; Pulmonary tumors; Needle biopsy of the lung	3
	Thoracic Surgery Conference Lecture Series, Brigham and Women's Hospital	Boston, MA
1985	Recent Advances in Pneumoconioses	1
	Current Concepts in Pulmonary Pathology, Massachusetts General Hospital	Boston, MA
1989	Pathology of Pneumoconioses	1
	Current Concepts in Pulmonary Pathology	Boston, MA

2005      Analytical Study of Asbestos Fibers, Postgraduate      1  
                Current Concepts in Asbestos-Related Lung Disease,  
                Harvard Medical School      Boston, MA

### Local Invited Presentations

No presentations below were sponsored by outside entities.

- 1992      Detection of Elements in Cells and Tissues of the Lung, Pathology Grand Rounds  
                Massachusetts General Hospital
- 1994      Particulate Air Pollution and Pulmonary Cellular Responses, Pathology Grand Rounds  
                Brigham and Women's Hospital
- 1996      The Legacy of the 6 Cities Program. New Research Directions. Public Health Rounds  
                Harvard School of Public Health
- 1996      Mechanisms of Morbidity and Mortality Associated with Particulate Air Pollution. Work  
                in Progress Seminar Physiology Program, Harvard School of Public Health
- 1997      Studies Using the Ambient Particle Concentrator. Presentation  
                Harvard Environmental Health Council Academia and Industry Symposium
- 1999      Air Pollution and Cardiovascular Responses. Lecture  
                Visiting Scholars Program, Harvard School of Public Health
- 2000      Lung Pathology. Presentation Brigham and Women's Hospital
- 2001      Cardiac Responses to Inhaled Particles. Research Seminar  
                Harvard School of Public Health
- 2001      Identification of Occupationally Inhaled Particles in the Lung. Surgical Pathology Update  
                Brigham and Women's Hospital
- 2002      CardioPulmonary Responses to Inhaled Particles. Work in Progress Seminar  
                Physiology Program, Harvard School of Public Health
- 2003      Bronchioloalveolar Carcinoma. Surgical Pathology Update  
                Brigham and Women's Hospital
- 2003      The Real Culprit for Ambient Air Pollution Health Effects: Ultrafine or Fine Particles.  
                Debate Physiology Program, Harvard School of Public Health
- 2004      Cardiovascular Responses to Ambient Particles. Work in Progress Seminar  
                Physiology Program, Harvard School of Public Health
- 2004      Inhaled Ambient Particles, Systemic Responses. Laboratory Presentation  
                Pulmonary Division, Brigham and Women's Hospital
- 2005      Pathogenesis of Mesothelioma—Asbestos to Cancer. Lecture in International  
                Mesothelioma Program Seminar Series  
                Brigham and Women's Hospital
- 2006      Electron Microscopy—Analytical TEM and SEM. Core Competency Seminar  
                Molecular and Integrative Physiological Sciences, Harvard School of Public Health
- 2007      Ambient Particle Research. Department of Environmental Health Colloquium  
                Harvard School of Public Health
- 2007      Effects of Air Particulate on the Heart. Work in Progress Seminar  
                Molecular and Integrative Physiological Sciences, Harvard School of Public Health
- 2008      Ultrastructural Analysis in Pulmonary Research. Core Competency Seminar  
                Molecular and Integrative Physiological Sciences, Harvard School of Public Health
- 2008      Communicating to the Public Information on the Cardiovascular Effects of Air Pollution  
                Lecture, Visiting Scholars Program, Harvard School of Public Health

2009	Unanswered Questions in Lung Biology - 2009. Molecular & Integrative Physiological Sciences, Harvard School of Public Health
2012	How does a person make a difference in the world? People to People Course Presentation International Students, Harvard Law School
2012	Cardiovascular Effects of Air Pollution
	Molecular and Integrative Physiological Sciences, Harvard School of Public Health
2013	Regarding Manganese
	CLARC Seminar Series, Harvard School of Public Health
2013	Assessing Cardiovascular Health Effects of Environmental Agents
	Core Competency Lecture Series, Department of Environmental Health, Harvard School of Public Health
2014	Overview of Ongoing Research Collaboration in the Cardiovascular Effects of Air Pollution
	SEAS Course on the Environment, Harvard College
2014	Pulmonary and Cardiovascular Health Effects of Traffic-related Aerosols Using a Rat Model of Diet-induced Metabolic Syndrome.
	CLARC Seminar Series, Harvard School of Public Health
2014	Air Pollution, Health Effects, and Climate Change, Understanding Trends in our Environment.
	Molecular and Integrative Physiological Sciences, Harvard School of Public Health
2015	Air Pollution and Asthma. Asthma Grand Rounds, AsthmaCenter, Brigham and Women's Hospital
2016	Simplified approaches to identifying foreign materials in the lung and other tissues using X-ray analyses. Surgical Pathology Update Dept of Pathology, Brigham and Women's Hospital.
2017	Science and Law: The Role of a Scientific Expert. Molecular and Integrative Physiological Sciences Seminar Series, Harvard School of Public Health

## **Report of Regional, National and International Invited Teaching and Presentations**

### **Invited Presentations and Courses**

**The one presentation below sponsored by an outside entity is so noted and the sponsor is identified.**

#### **Regional**

1980	Approaches to Diagnostic Biopsies. Presentation New England Society of Pathologists
1985	Pulmonary Vascular Disease. Lecture Pulmonary Pathology Section, New England Society of Pathologists
1997	Health Effects of Ambient Air Particles. Lecture NESCUOM Regional Meeting
1997	Toxicity of Ambient Fine Particles. Invited Speaker Connecticut Environmental Concerns Conference, Particulate Air Pollution and Human Health. University of Connecticut, Storrs, CT
2010	Ambient Air Pollution and Cardiovascular Disease. Doctoral Student's Invited Speaker

Seminar, Department of Environmental Health Boston University  
2013 Complex Mixtures of Traffic-Related Particulate Induced Responses in the Respiratory and Cardiovascular Systems Department of Environmental Health Seminar Series, Boston University School of Public Health  
2014 Air Pollution, Health Effects, and Climate Change, Understanding Trends in our Environment. Sloan School of Business, Boston College  
2017 Science and Law: Issues in Permitting a new Cement Plant in New York State. Sloan School of Business, Boston College, Boston, MA  
2018 Science and Law: A New Cement Plant for the Eastern USA- A 20 Year Saga. Dept of Economics, Brigham Young University, Provo Utah.  
2018 Identification of Foreign Particles in Human Tissues using Raman Spectroscopy. New England Society of Microscopy, Meeting at MIT

**National**

1988 Comparison of preparation techniques for preserving soluble ions in cells for elemental analysis with the Zeiss CEM902. Lecture  
Forum on Applications of Energy-Filtered Electron Microscopy, Electron Microscopy Society of America Annual Meeting, Milwaukee, WI  
1990-1991 Electron Energy Loss Spectroscopy. Lecture  
Advanced electron microscopy course, George Washington University  
1991 Pulmonary Lymphoma. Lecture  
Pulmonary Pathology Specialty Course, International Academy of Pathology, Chicago  
1992-1993 Detection of Elements using Electron Spectroscopic Imaging and Electron Energy Loss Analysis. Lecture  
International Conference on Current Trends in Immunomicroscopy. Washington, DC  
1993 Morphology of Extracellular Pulmonary Lining Fluids. Speaker and Participant  
International workshop on Interactions of Particles with the Lung. San Francisco, CA  
1995 Mortality from Exposure to Concentrated Air Particles in Animals with Pulmonary Disease. Presentation  
US Environmental Protection Agency, Clean Air Standards. Advisory Committee Meeting, Research Triangle Park, NC  
1996 Mechanisms of Morbidity and Mortality Associated with Environmental Particulate Inhalation. Lecture  
2<sup>nd</sup> Colloquium on Particulate Air Pollution and Health, Park City, Utah  
1996 Mechanisms of Morbidity and Mortality associated with Particulate Air Pollution. Speaker  
EPA Visiting Professor Series Seminar, Research Triangle Park, NC  
1997 Cardiac Effects of Inhaled Ambient Particles. Speaker and Visiting Professor  
Lovelace Respiratory Research Institute, Albuquerque, New Mexico  
1998 Particular Health Effects. Invited Plenary Speaker  
Air and Waste Management Association Conference, Long Beach, CA  
1998 Potential Mechanisms in Cardiac Disease. Invited Speaker  
American Thoracic Society Meeting Symposium Air Quality: Particulate Matter and Disease, Chicago, IL  
1998 New Approaches in Multi-Component Inhalation Toxicology Research. Invited Speaker  
American Association for Aerosol Research, Particulate Matter and Health Symposium, Cincinnati, OH

- 1999      Cardiovascular Responses to Inhaled Particles. Invited Speaker  
Johns Hopkins University School of Public Health
- 2000      Animal Models for the Investigation of Cardiovascular Responses to Particles. Invited Speaker, Session Co-Chair  
American Thoracic Society Workshop, Inhaled Environmental/Occupational Irritants and Allergens: Mechanisms of Cardiovascular and Systemic Responses, Scottsdale, AZ
- 2000      Cardiac Responses to Ambient Air Pollution. Invited Speaker  
American Public Health Association Meeting, Boston
- 2000      Cardiac Responses to Ambient Air Pollution. Invited Speaker  
Mid-Atlantic Society of Toxicology Meeting, Nutley, NJ
- 2000      Findings in Animals. Invited Speaker  
University of Rochester Symposium on Cardiac Responses to Inhaled Particles, NY
- 2001      Cardiovascular Responses to Ambient Air Particles. Invited Speaker  
North Carolina State University Veterinary School Graduate Program, Raleigh, NC
- 2001      Cardiovascular Responses to Inhaled Particles. Invited Speaker  
NIEHS Retreat, Pinehurst, NC
- 2002      Mechanisms of Inhaled Particle Cardiovascular Effects. Invited Speaker  
National Research Council Committee on Research Priorities for Airborne Particulate Matter, Interdisciplinary Workshop, Seattle, WA
- 2002      Cardiovascular Responses to Inhaled Particles. Invited Speaker  
Department of Pathology, University of Rochester School of Medicine, NY
- 2003      Particulate Matter. Invited Participant, Session Co-Chair  
Atmospheric Sciences, Exposure and the Fourth Colloquium on PM and Human Health. Pittsburgh, PA
- 2003      Pollution and Heart Disease: The Emerging Science of Environmental Cardiology. Invited Participant, Session Co-chair and Speaker  
American Heart Association Meeting, Orlando, FL
- 2004      Regional Cardiac Blood Flow with Air Particle Exposure Invited Speaker  
NIEHS/EPA Research Program, The Role of Air Pollutants in Cardiovascular Disease. Washington, DC
- 2004      Cardiovascular Effects of Ambient Air Pollution: Laboratory Studies Using Animal Models, Invited Speaker  
Louisville Symposium on Environmental Cardiology, Louisville, KY
- 2006      Toxicological Assessment of Particulate Matter Derived from Coal-Fired Power Plant Emissions, Invited Speaker  
University of Indiana Medical School, Terre Haute
- 2006      Effects of Ambient Particles on the Heart. Invited Speaker  
Session C Air Pollution and Cardiovascular, AWMA Featured Symposium Particulate Air Pollution and Health
- 2006      The Role of Air Pollutants in Cardiovascular Disease: Effects of Air Pollution on the Myocardium. Invited Speaker
- 2008      Etiology and Pathogenesis of Malignant Pleural Mesothelioma—Role of Asbestos in Lecture in Postgraduate Course Surgery-based Multimodality Therapy for Malignant Pleural Mesothelioma
- 2012      Cardiovascular Effects of Air Pollution, Department of Environmental and Occupational Health, University of Pittsburgh School of Public Health
- 2013      Exposure of Animals with High-Fructose Diet Induced Metabolic Syndrome to Traffic-

Related Air Pollution, EPA Center Director's Meeting, Seattle, WA  
2014 New Approaches to Telemetered Cardiovascular Data Analysis, Introduction. EMKA Users Meeting, Columbus, OH (Sponsored by EMKA Technologies).  
2015 Toxicology of Vehicle Emissions from Biofuels. Biofuels meeting at Inter American Development Bank, Washington D.C.  
2016 Cardiovascular effects of air pollution in an animal model of Metabolic Syndrome. EPA Center Director's Meeting, Ann Arbor, MI  
2020 Identification of Platy Talc and Fibers in the Female Genital Tract. FDA Public Meeting, Testing Methods for Asbestos in Talc and Cosmetic Products containing Talc. Washington, D.C.

**International**

1988 Electron Energy Loss Spectroscopy Using the Zeiss CEM902 to Assess Intracellular Injury. Workshop Presentation  
US-FRG Cooperative Program in Pulmonary Research Workshop: Structural Consequences of Biochemical and Cellular Changes in the Lungs Caused by Injury, Günzburg, West Germany  
1989 Pathology of Fetal and Neonatal Lungs. Lecture  
Congress of the Polish Society of Pathologists, Poznan, Poland  
1989 Embryonic Development of Lung Macrophage Membrane Characteristics. Lecture  
Congress of the Polish Society of Pathologists, Poznan, Poland  
1991 Mechanisms and Consequences of Ingestion of Particles by Alveolar Macrophages. Lecture  
EULEP Symposiumon Alveolar Macrophages, Oxford, United Kingdom  
1997 Can Studies in the Laboratory Substantiate the Epidemiology. Ambient Particulate Matters. Symposium Speaker  
Symposium on Particulate Pollution and Biologic Plausibility. A/ATS International Conference, San Francisco  
1997 Speaker, National Air Pollution Conference  
Santiago, Chile  
1997 Invited Speaker and Visiting Professor  
Department of Pathology, University of Sao Paulo, Brazil  
1998 Pathophysiology in Animal Exposures to Concentrated Ambient Air Particles. Invited Speaker and Session Chair  
3<sup>rd</sup> International Congress of Pathophysiology, Lahti, Finland  
1999 Cardiovascular Responses to Inhaled Particles. Invited Speaker  
7<sup>th</sup> International Inhaled Particles Symposium, Hanover, Germany  
1999 Systemic Effects of Inhaled Environmental Particles. Plenary Speaker  
12<sup>th</sup> International Congress ISAM Vienna, Austria  
2000 Summary of Experimental Studies of Cardiovascular Effects of Air Pollution. Featured Speaker  
American Thoracic Society 96<sup>th</sup> International Conference, Mini-Symposium, Toronto, CA  
2000 Laboratory Studies of Cardiovascular Responses to Air Pollution. Invited Speaker  
University of Santiago/CONAMA Symposium on Ambient Air Pollution, Santiago, Chile  
2003 Invited Speaker and Visiting Professor  
Department of Pathology, University of Sao Paulo, Brazil

2008	Keynote Speaker Japanese Society for Occupational and Environmental Medicine, Tokyo, Japan
2009	Invited Speaker, International Society for Aerosols in Medicine, Monterey, California
2009	Keynote Speaker Brazilian Society of Cardiology, Symposium on the Environment, Sao Paulo, Brazil
2010	Invited Speaker International Academy of Pathology Congress, Toxicology Symposium, Sao Paulo, Brazil
2010	Invited Speaker USEPA Air 40 Webinar Series – Five years of Progress in PM Research; The Harvard-EPA Center: Novel Exposure Scenarios to Define the Health Effects of Particle Sources
2012	Organizer, Chair, and speaker – Harvard-USEPA Webinar “Modeling Secondary Particle Formation in the Laboratory for Toxicological Studies”
2012	Invited Speaker Symposium on Air Pollution Experimental Biology Meeting San Diego CA April 2012
2012	Invited Speaker University of Sao Paulo Air Pollution Symposium Sao Paulo Brazil August 2012
2012	Keynote Speaker, International Occupational and Environmental Health Summit, Philadelphia, PA. September 2012
2013	Invited Speaker, Faculty of Medicine International Symposium, University of Sao Paulo Health Effects of Traffic-Related Air Pollution, Sao Paulo Brazil September 10, 2013
2014	Invited Speaker, Faculty of Medicine International Symposium, University of Sao Paulo Health Effects of Traffic-Related Air Pollution and Climate Change, Sao Paulo Brazil June 25, 2014
2015	Invited Speaker, Faculty of Medicine International Symposium, University of Sao Paulo Update: Health Effects of Traffic-Related Air Pollution, Sao Paulo Brazil June 24, 2015
2016	Invited Speaker, School of Public Health University of Sao Paulo, Symposium on Obesity, Metabolic Syndrome and Air Pollution. Health Effects of Traffic-Related Air Pollution, Sao Paulo Brazil May 16, 2016
2016	Invited Keynote Speaker, Children and Adolescent Health Convocation, Cardiovascular Health and Heart Rate Variability Symposium Vitoria Brazil, May 18, 2016

## **Report of Clinical Activities and Innovations**

### **Current Licensure and Certification**

1975	American Board of Pathology, Anatomic Pathology Certification
1978-	Commonwealth of Massachusetts Full-Medical License

### **Practice Activities**

1973-	Surgical Pathology Service	Hospital of Medical College of PA, Philadelphia, PA	6 wks/yr biopsies
1978			6 wks/yr large resection specimens
1973-	Autopsy Pathology Service	Hospital of Medical College of PA, Philadelphia, PA	12 wks/yr senior pathologist on service
1977			

1978	Autopsy Pathology Service	Hospital of Medical College of PA, Philadelphia, PA	50 wks/yr head of service; 12 wks/yr senior pathologist on service
1978-1985	Pulmonary Pathology Service	Brigham and Women's Hospital, Boston, MA	50 wks/yr head of service; Consulting pathologist on all pulmonary cases of surgical and autopsy pathology services
1978-1996	Autopsy Pathology Service	Brigham and Women's Hospital, Boston, MA	10 wks/yr senior pathologist on service
1986-1995	Pulmonary Pathology Service	Brigham and Women's Hospital, Boston, MA	52 wks/yr head of service; 25 wks/yr consulting pathologist on all pulmonary cases of surgical and autopsy pathology services
1996-2005	Pulmonary Pathology Service	Brigham and Women's Hospital, Boston, MA	52 wks/yr head of service; 20 wks/yr consulting pathologist on all pulmonary cases of surgical and autopsy pathology services
2005-2010	Pulmonary Pathology Service	Brigham and Women's Hospital, Boston, MA	52 wks/yr head of service; 16 wks/yr consulting pathologist on all pulmonary cases of surgical and autopsy pathology services
2010-2015	Pulmonary Pathology Service	Brigham and Women's Hospital, Boston, MA	52 wks/yr head of service; 12 wks/yr consulting pathologist on all pulmonary cases of surgical and autopsy pathology services
2015-2017	Pulmonary Pathology Service	Brigham and Women's Hospital, Boston, MA	16 wks/yr consulting pathologist on all pulmonary cases of surgical and autopsy pathology services
2014-2017	Autopsy Pathology Service	Brigham and Women's Hospital, Boston, MA	4 wks/yr senior pathologist on service
2017-Present	Analytical Pathology Service	John J Godleski, MD PLLC	Pathologist, CEO/CFO

## **Report of Technological and Other Scientific Innovations**

1995 Harvard University New Invention B1157-95. Rat alveolar macrophage cDNA library. Licensed to PeproTech Inc., Rocky Hill, NJ. Widely used commercially.

1995	Harvard University New Invention B1139-95. Rat macrophage inflammatory protein-1 a cDNA clone. Licensed to PeproTech Inc., Rocky Hill, NJ. Widely used commercially
2001	Krishna Murthy, GG and Godleski, JJ. Device for monitoring breathing responses in animals and humans. US Patent No: US 6224.560 B1.
2012-Present	Ferguson S, Diaz EA, and Godleski, JJ. Small animal plethysmograph and inhalation exposure system. US and International Patents Pending Licensed to EMKA Technologies

## **Report of Scholarship**

Peer Reviewed Research Investigations

1. **Godleski JJ.** A chromosome modality study of the Walker carcinosarcoma 256. *New Phys* 1967; 16:149-154.
2. Thompson DS, **Godleski JJ**, Herman SP. Prognosis: Post-infectious mononucleosis. *J Am Coll Health Assoc* 1969; 17:453-457.
3. **Godleski JJ**, Lee RE, Leighton, J. Studies on the role of polymorphonuclear leukocytes in neoplastic disease using the chick embryo and Walker carcinosarcoma 256 *in vivo* and *in vitro*. *Cancer Res* 1970; 30:1986-1993.
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## Letters to the Editor

1. Talcott JA, Garnick MB, Stomper PC, **Godleski JJ**, Richie JP. Nodular pneumonitis after cancer chemotherapy [letter]. Ann Intern Med 1989; 110:9.

### Narrative Report – Dr. John J. Godleski

My research at Harvard Medical School, Harvard School of Public Health, and Brigham and Women's Hospital, focused upon the role of inhaled particles in pulmonary and systemic diseases. My lab made major strides in studying experimentally how increases in inhaled ambient particles lead to death, a serious public health problem found in epidemiological studies. I advocated the concept that the principle target organ for ambient particle health effects is the cardiovascular system, an idea that has set the research agenda in this field nationally and internationally since my lab's initial work in this area. Using animal models of the health effects of air pollution, studies from my laboratory provided both plausibility and a mechanistic understanding of the pulmonary and cardiovascular responses to inhalation of increased levels of ambient particulate air pollution. These studies were supported by research grants from the Health Effects Institute, the US EPA, and a Program Project Grant from NIEHS. I was Principal Investigator of all of these studies.

My recent research focused upon responses to inhaled particulates and used novel exposure models developed to assess health effects of 'real-world' ambient atmospheric particles. We sought to understand specific autonomic nervous system as well as inflammatory and genetic mechanisms by which particles affect the respiratory and cardiovascular systems. We defined sources of air pollution in attempts to identify the most toxic sources of pollution in need of control. For these studies, funding and access to coal-fired power plants was sought from the Electric Power Research Institute (EPRI). At the same time, the US EPA initiated and funded EPA academic centers for research in ambient particles. Investigators from the HSPH Department of Environmental Health competed for these centers with Dr. Koutrakis as Director of the Harvard Center and I served as Associate Director. After the initial competition, these Centers were re-competed twice more and only the Harvard Center with the same leadership team was successfully funded each time. In each of the EPA Center grants, in addition to being Associate Director, I led a research project focused upon the health effects of sources of air pollution.

For these studies, a mobile laboratory was designed and built to include a reaction chamber for the formation of secondary particles, monitoring and characterization of the exposure aerosols, capabilities for animal housing, surgery, and exposure, as well as the study of respiratory and cardiovascular pathophysiological responses of the animals. I led studies carried out at electric power plants in the mid-west and southern United States. These studies found mild, but statistically significant, respiratory and cardiac adverse effects for the most complex secondary aerosols from these plants. In addition to these experimental outcome findings, these studies represented a new approach to the study of sources and secondary particle formation and resulted in eight papers published in a special issue of the journal Inhalation Toxicology. I was the editor of this issue.

The same approach was used to study the respiratory and cardiovascular effects of vehicular sources of pollution. It was important to have reproducible aerosols in order to study the mechanisms of health effects observed, to have a mixture of vehicles representative of urban traffic pollution, to have a mixture

of both tailpipe emissions as well as particulate from tire and brake wear, and to have a source that had little or no input of contaminants from other sources. I secured an arrangement with the Massachusetts Department of Transportation to use the east-bound lane of the Ted Williams tunnel and a ventilation building of this tunnel on a secure site for the mobile laboratory. We found traffic pollution to be considerably more toxic than power plant emission or concentrated ambient urban particulate. For example, primary plus secondary traffic particles at a concentration of ~50 µg/m<sup>3</sup> increased blood pressure 10-20 mm Hg whereas ~300 µg/m<sup>3</sup> exposure to concentrated ambient particulate raised blood pressure 2-4 mm Hg which was statistically significant, but not clinically impressive. Similarly, all respiratory toxicological parameters including increases in lung inflammation and decreases in respiratory air flow were greater at the ~50 µg/m<sup>3</sup> concentration of traffic derived aerosols compared to ~300 µg/m<sup>3</sup> exposures with power plant derived aerosols or concentrated ambient particles. These findings support the need to continue to limit both tail-pipe and other emissions from both cars and trucks.

In addition to my role in the EPA Center, I also led the Inhaled Particles Research Core in our NIEHS Center at Harvard School of Health that was competitively renewed in 2015 for an additional five years of funding. Within the context of the NIEHS Center, I also led the Electron Microscopy Laboratory at HSPH that includes Scanning Electron Microscopy and energy dispersive X-ray analysis capabilities. I obtained these instruments as principal investigator on a Shared Instrumentation Grant from NIH and provide medical area-wide service to investigators within the NIEHS Center and within the Harvard Catalyst program. I also had funding from a South American consortium to study the toxicity of auto exhaust generated from biofuels. Overall, about 50% of my academic effort was directed toward research.

I have not only scientifically contributed to control of air pollution in the United States, but have worked for control of pollution in the mega cities of South America. I was appointed by the Dean of HSPH as director of the Harvard-Brazilian program at that institution. This appointment was based upon the program I developed in 2005 with Professor Paulo Saldiva, Chair of Pathology at the University of Sao Paulo. The concept of this program was to interest and develop medical students to eventually take a leadership role in combating the adverse effects of environmental pollution in Brazil. In this program, top medical students take a year off from their medical school studies and did research in laboratories at HSPH including my own. The program grew to as many as sixty annual applicants, and became the model for the nation-wide Brazilian Program, Science without Borders. To date, more than one-hundred students have participated in the program, these students have co-authored more than 60 papers, and among alumni who have finished medical school, twenty are involved in some form of environmental research within their specialties.

In addition to the programs described above in environmental research at HSPH, I led the pulmonary pathology unit at Brigham and Women's Hospital from 1978-2015, and I was a primary mentor of residents and fellows in pulmonary pathology. Pulmonary pathology at BWH grew to seven faculty members involved in the surgical pathology of thoracic diseases and the autopsy service. In addition to taking a regular turn on the pulmonary pathology service, I also served on the autopsy service of BWH. The pulmonary pathology service trained more than 20 fellows, all of which continue to have a role in pulmonary pathology in their careers. I also headed the pathology core in the International Pleural Mesothelioma Program at BWH. My research in mesothelioma focused upon asbestos as the cause of this malignancy and sought to understand mechanisms of fiber redistribution in the thorax, carcinogenesis, patterns of tumor growth with this malignancy that have prognostic significance, and how levels of retained asbestos fibers may play a role in patient survival.

I have authored more than 180 peer-reviewed publications including book chapters. I had teaching

responsibilities at Harvard School of Public Health as a mentor of pre and postdoctoral fellows. In 2004, my graduate student, Gregory Wellenius, won the Edgar Haber Award at Harvard School of Public Health for the outstanding thesis in laboratory research at HSPH. I have been the primary mentor of five graduate students at HSPH. I mentored twenty-two post-doctoral fellows in my lab.

At HMS, I taught in the introductory pathology course, and have taught in the pulmonary and infectious disease courses. My clinical responsibilities for pulmonary pathology at Brigham and Women's Hospital included being a primary liaison of the pathology department with the BWH thoracic surgery and pulmonary medicine programs. I had clinical interaction, teaching, and research responsibilities with those programs through participation in their clinical management, clinical conferences, and research programs as consultant pathologist.

In 2017, I retired from my professorial positions at BWH, HMS, and HSPH and was given Professor of Pathology Emeritus status in 2018. I remain a consultant to multiple research and training programs at HSPH and BWH. Also in 2017, I started a small company to continue my interest in environmental health and specifically the identification of foreign particles in human tissue. This company, John J Godleski, MD PLLC, now has 7 employees who contribute to studies in both these areas of interest.